Installation Instructions

A·B *Allen-Bradley*

DeviceNet ArmorBlock™ Network Powered 16-input Module

Catalog number 1732D-IBDPM12MND, Series A

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Rockwell Automation

Important User Information

Solid-state equipment has operational characteristics differing from those of electromechanical equipment. Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls (Publication SGI-1.1 available from your local Rockwell Automation sales office or online at http://www.rockwellautomation.com/literature/) describes some important differences between solid-state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid-state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

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Throughout this manual, when necessary, we use notes to make you aware of safety considerations.

	WARNING: Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.
	ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard and recognize the consequences.
	SHOCK HAZARD: Labels may be on or inside the equipment (for example, drive or motor) to alert people that dangerous voltage may be present.
	BURN HAZARD: Labels may be on or inside the equipment (for example, drive or motor) to alert people that surfaces may reach dangerous temperatures.
IMPORTANT	Identifies information that is critical for successful application and understanding of the product.

Environment and Enclosure

ATTENTION: This equipment is intended for use in overvoltage Category II applications (as defined in IEC 60664-1), at altitudes up to 2000 m (6562 ft) without derating.

This equipment is considered Group 1, Class A industrial equipment according to IEC/CISPR 11. Without appropriate precautions, there may be difficulties with electromagnetic compatibility in residential and other environments due to conducted and radiated disturbances.

This equipment is supplied as enclosed equipment. It should not require additional system enclosure when used in locations consistent with the enclosure type ratings stated in the Specifications section of this publication. Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings, beyond what this product provides, that are required to comply with certain product safety certifications.

In addition to this publication, see:

- Industrial Automation Wiring and Grounding Guidelines, Rockwell Automation publication 1770-4.1, for additional installation requirements.
- NEMA Standard 250 and IEC 60529, as applicable, for explanations of the degrees of protection provided by enclosures.

Preventing Electrostatic Discharge

ATTENTION: This equipment is sensitive to electrostatic discharge, which can cause internal damage and affect normal operation. Follow these guidelines when you handle this equipment:
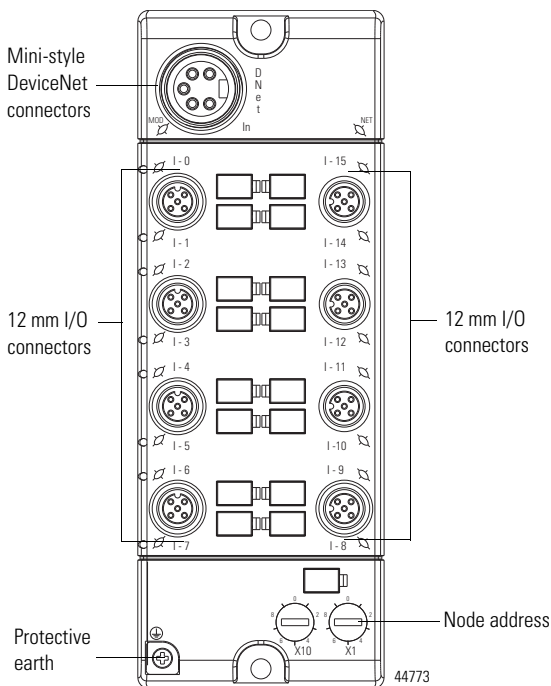
- Touch a grounded object to discharge potential static.
- Wear an approved grounding wriststrap.
- Do not touch connectors or pins on component boards.
- Do not touch circuit components inside the equipment.
- Use a static-safe workstation, if available.
- Store the equipment in appropriate static-safe packaging when not in use.

About the Module

The DeviceNet 1732D ArmorBlock I/O family consists of standalone 24V DC I/O modules that communicate via the DeviceNet network. The sealed IP67 housing of these modules requires no enclosure. Note that environmental requirements other than IP67 may require an additional appropriate enclosure. I/O connectors are sealed M12-style. The 1732D-IBDPM12MND module is shown here.

DeviceNet ArmorBlock Network Powered 16-input Module

Ground Conductors

Conductor	Description
Protective earth	Provides the grounding of field devices and is internally connected to each Pin 5 of the M12 I/O connectors.

The DeviceNet network uses advanced network technology, producer/consumer communication, to increase network functionality and throughput. Visit our web site at www.ab.com/networks for producer/consumer technology information and updates.

Catalog Number Explanation

The catalog number 1732D-IBDPM12MND refers to a DeviceNet 24V DC 8-port, 16-input mini-style network connector module.

Install the Module

To install the module:

- Set the node address.
- Mount the module.
- Connect the cordsets.

Set the Node Address

Valid node addresses are 00…63.

Set the node address using either the rotary switches, RSNetWorx for DeviceNet, DeviceNetManager, or another software configuration tool. Setting the switches at 64…99 lets the software have address control.

Each module is shipped with their node address set at 63. Remove the caps on the front of the module to access the switches. The two switches are:
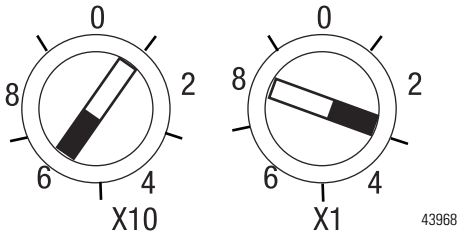
- X10 (most significant digit) – left side of module
- X1 (least significant digit) – right side of module

To reset the node address:

1. Rotate the switches using a small-bladed screwdriver.
2. Line up the small black dot on the switch with the number setting you wish to use.
3. Cycle power.

Node Address Default Setting

This example shows the default node address set at 63.

The rotary switches are read periodically. If the switches have been changed since the last time they were read and no longer match the online address, a minor fault occurs, which is indicated by the module indicator flashing red.
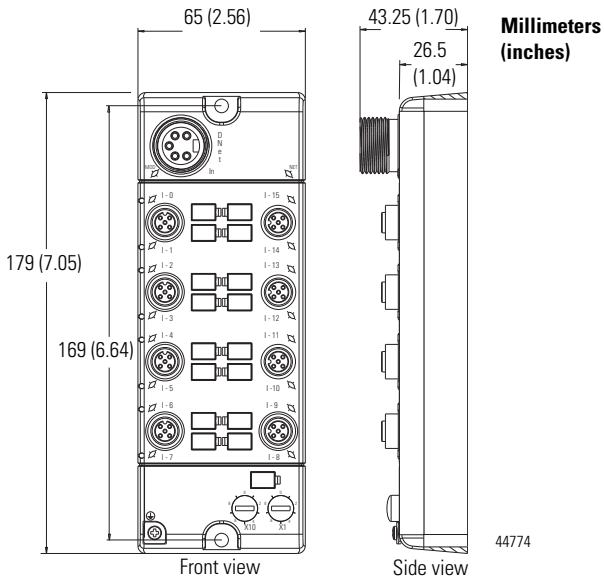
Settings of 64…99 cause the module to use the last valid node address stored internally. For example, if the last setting internally was 40 and the setting is changed to 68, when you power up, the address defaults back to 40.

The module is equipped with AutoBaud detect. AutoBaud lets the module read the settings already in use on your DeviceNet network and automatically adjusts to those settings.
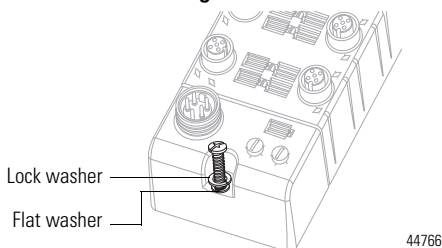
Mount the Module

Use the two sets of mounting holes to mount the module directly to a panel or machine. Mounting holes accommodate #6 (M3) pan-head screws. The torque specification is 0.64 Nm (6 lb-in.).

Refer to the mounting dimensions diagram to help you mount the module.

Module Dimensions

65 (2.56) 43.25 (1.70) **Millimeters (inches)**

26.5 (1.04)

179 (7.05)

169 (6.64)

44774

Front view Side view

Mount the Module in High Vibration Areas

If you mount the module in an area that is subject to shock or vibration, we recommend you use a flat and a lock washer to mount the module. Mount the flat and the lock washer as shown in the mounting diagram. Torque the mounting screws to 0.64 Nm (6 lb-in.).

High Vibration Area Mounting

Lock washer

Flat washer

44766

Connect the Cordsets

The ArmorBlock DeviceNet family has 5-pin micro-style connectors. We provide caps to cover the unused connectors on your module. Connect the quick-disconnect cordsets you selected for your module to the appropriate ports.
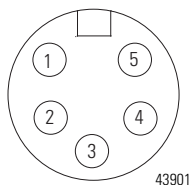
> ⚠️ **ATTENTION:** To comply with the CE Low Voltage Directive (LVD), all connected I/O must be powered from a source compliant with the following: Safety Extra Low Voltage (SELV) or Protected Extra Low Voltage (PELV).

Network Connector

Refer to the pinout diagram for the network connector.

Mini-style Input Male Connector

(View into connector)
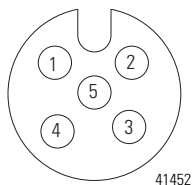Pin 1   Drain
Pin 2   V+
Pin 3   V-
Pin 4   CAN_H
Pin 5   CAN_L

43901

I/O Connectors

Refer to the pinout diagram for the I/O connector.

Micro-style 5-pin Female Input Connector

(View into connector)
Pin 1   Sensor source voltage
Pin 2   Input B
Pin 3   Return
Pin 4   Input A
Pin 5   PE

41452

Refer to Cordsets and Field Attachables, publication M117-CA502A, or visit the Connection Devices website, http://www.ab.com/connectionsystems.

⚠ **ATTENTION:** Make sure all connectors and caps are securely tightened to properly seal the connections against leaks and maintain IP enclosure type requirements.

Communicate with the Module

This module's I/O is exchanged with the master through a cyclic, polled, or change-of-state connection.

- Cyclic: Allows configuration of the block as an I/O client. The block will produce and consume its I/O cyclically at the rate configured.
- Polled: A master initiates communication by sending its polled I/O message to the module. The module consumes the message, updates outputs, and produces a response. The response has input data.
- Change-of-state: Productions occur when an input changes or a fault condition occurs. If no input or fault condition change occurs within the expected packet rate, a heartbeat production occurs. This heartbeat production tells the scanner module that the I/O module is alive and ready to communicate. Consumption occurs when data changes and the master produces new output data to the I/O block.

Refer to the Module Data Definitions table for more information.

1732D-IBDPM12MND Data Definitions

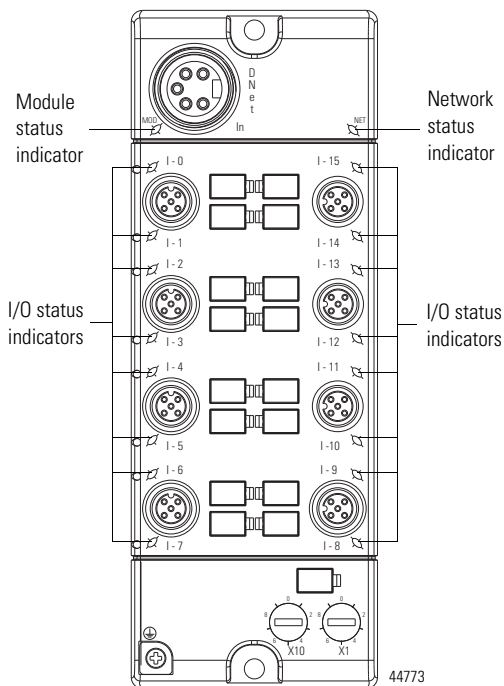| Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Produce 0	I7	I6	I5	I4	I3	I2	I1	I0
Produce 1	I15	I14	I13	I12	I11	I10	I9	I8
Produce 2	In short							
Where:	I = Input data; 0 = Off, 1 = On In short 0 = Working, 1 = Sensor source voltage fault							

Interpret Status Indicators

This module has the following indicators:

- Network and module status indicators for DeviceNet
- Auxiliary power indicator
- Individual I/O status indicators for inputs and outputs

1732D-IBDPM12MND

Indicator Status for Modules

	Status	Description
Module status	Off	No power applied to the device.
	Green	Device is online and has one or more I/O connections in established state.
	Flashing green	Device needs commissioning due to missing, incomplete, or incorrect configuration.
	Red	Critical fault – device timed out or has an unrecoverable fault.
	Flashing red	Recoverable fault – input or output short circuit.
Network status	Off	Device is not online: - Device has not completed dup_MAC-id test. - Device not powered – check module status indicator.
	Green	Device operating normally. As a Group 2 module, it means that the module is allocated to a master.
	Flashing green	Device is online with no connections in the established state.
	Red	Critical link failure – failed communications module.
	Flashing red	Recoverable fault – an I/O connection has timed out.
I/O status	Off	I/O is not energized or is not valid.
	Yellow	I/O is energized and valid.

Specifications

General Specifications

Attribute	Value
Number of inputs	16
Input type	61131-2 Type 3 compatible
Off-state input voltage, max	5V DC
On-state input voltage, min	11V DC
On-state input voltage, nom	24V DC
On-state input voltage, max	25V DC
Sensor source voltage, min	11V DC
Sensor source voltage, max	25V DC
Off-state input current, max	1.5 mA @ 5V DC
On-state input current, max	5 mA @ 25V DC

Input delay time[1]
  Off to On
  On to Off
	0…16,000 μs

DeviceNet power voltage range	11…25V DC
Sensor source current per module, max	500 mA
DeviceNet current	75 mA plus sum of sensor currents
Indicators	1 green/red – module status 1 green/red – network status 16 yellow – input status
Isolation voltage	50V (continuous), Basic Insulation Type, inputs to network No isolation between individual inputs Type tested @ 707V DC for 60 s
Communication rate	125 Kbps @ 500 m (1640 ft) for thick cable, flat media length 375 m (1230 ft) 250 Kbps @ 200 m (600 ft) for thick cable, flat media length 150 m (492 ft) 500 Kbps @ 100 m (330 ft) for thick cable, flat media length 75 m (246 ft)
Dimensions (HxWxD), approx.	179 x 65 x 43.25 mm (7.05 x 2.56 x 1.70 in)
Enclosure type rating	Meets IP65/66/67/69K (when marked), and NEMA 4X/6P with receptacle dust caps or cable termination
Wiring category[2][3]	1 – on signal ports 2 – on communication ports
Weight, approx.	0.392 kg (0.864 lb)

(1)   Input Off-to-On or On-to-Off delay is time from a valid input signal to recognition by the module.

(2)   Use this conductor category information for planning conductor routing as described in Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

(3)   Refer to Connection Systems, publication C116-CA508.

Environmental Specifications

Attribute	Value
Temperature, operating	IEC60068-2-1 (Test Ad, Operating Cold), IEC60068-2-2, (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock): -20…60 °C (-4…140 °F)
Temperature, surrounding air, max.	60 °C (140 °F)
Temperature, nonoperating	IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock): -40…85 °C (-40…185 °F)
Relative humidity	IEC 60068-2-30 (Test Db, Unpackaged Damp Heat): 5…95% noncondensing
Vibration	IEC 60068-2-6 (Test Fc, Operating): 5 g @ 10…500 Hz
Shock, operating	IEC 60068-2-27 (Test Ea, Unpackaged Shock): 30 g
Shock, nonoperating	IEC 60068-2-27 (Test Ea, Unpackaged Shock): 50 g
ESD immunity	IEC 61000-4-2: 8 kV contact discharges 8 kV air discharges
Radiated RF immunity	IEC 61000-4-3: 10V/m with 1 kHz sine-wave 80% AM from 80…2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 1V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz
EFT/B immunity	IEC 61000-4-4: ±3 kV @ 5 kHz on signal ports ±2 kV @ 5 kHz on communication ports

Environmental Specifications

Attribute	Value
Surge transient immunity	IEC 61000-4-5: ±1 kV line-line (DM) and ±2 kV line-earth (CM) on signal ports ±2 kV line-earth (CM) on communication ports
Conducted RF immunity	IEC 61000-4-6: 10V rms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz
Emissions	CISPR 11: Group 1, Class A

Certifications

Certification (when product is marked)[1]	Value
c-UL-us	UL-listed Industrial Control Equipment, certified for US and Canada. See UL File E322657.

CE	European Union 2004/108/EC EMC Directive, compliant with:
	    EN 61326-1; Meas./Control/Lab., Industrial Requirements
	    EN 61000-6-2; Industrial Immunity
	    EN 61000-6-4; Industrial Emissions
	    EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)

C-Tick	Australian Radiocommunications Act, compliant with: AS/NZS CISPR 11; Industrial Emissions
ODVA	ODVA conformance tested to DeviceNet specifications

[1]   See the Product Certification link at http://www.ab.com for Declaration of Conformity, Certificates, and other certification details.

Notes:

Rockwell Automation Support

Rockwell Automation provides technical information on the Web to assist you in using its products. At http://www.rockwellautomation.com/support/, you can find technical manuals, a knowledge base of FAQs, technical and application notes, sample code and links to software service packs, and a MySupport feature that you can customize to make the best use of these tools.

For an additional level of technical phone support for installation, configuration and troubleshooting, we offer TechConnect support programs. For more information, contact your local distributor or Rockwell Automation representative, or visit http://www.rockwellautomation.com/support/.

Installation Assistance

If you experience a problem within the first 24 hours of installation, please review the information that's contained in this manual. You can also contact a special Customer Support number for initial help in getting your product up and running.

United States or Canada	1.440.646.3434
Outside United States or Canada	Use the Worldwide Locator at http://www.rockwellautomation.com/support/americas/phone_en.html, or contact your local Rockwell Automation representative.

New Product Satisfaction Return

Rockwell Automation tests all of its products to ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned, follow these procedures.

United States	Contact your distributor. You must provide a Customer Support case number (call the phone number above to obtain one) to your distributor to complete the return process.
Outside United States	Please contact your local Rockwell Automation representative for the return procedure.

Documentation Feedback

Your comments will help us serve your documentation needs better. If you have any suggestions on how to improve this document, complete this form, publication RA-DU002, available at http://www.rockwellautomation.com/literature/.